

CHANGES IN FLOOD CHARACTERISTICS AFTER A MAJOR EVENT: RE-EVALUATING THE EFFECT OF HURRICANE FLOYD ON FUTURE FLOOD RESPONSE



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Outline

- Immediate Impacts/Measures of Floyd
- Led to monitoring, modeling and policy changes
- Despite Urbanization, a relatively underdeveloped and unregulated watershed
- Generally know large floods can alter flood characteristics
- 10 years later allows a quantitative look at this

Immediate Effects of Floyd

- Historic flood heights
- Flood water estimated at 95% Pamlico Sound volume (Bales, 2003)
- Many location exceeded 24hr, 100 year rainfall



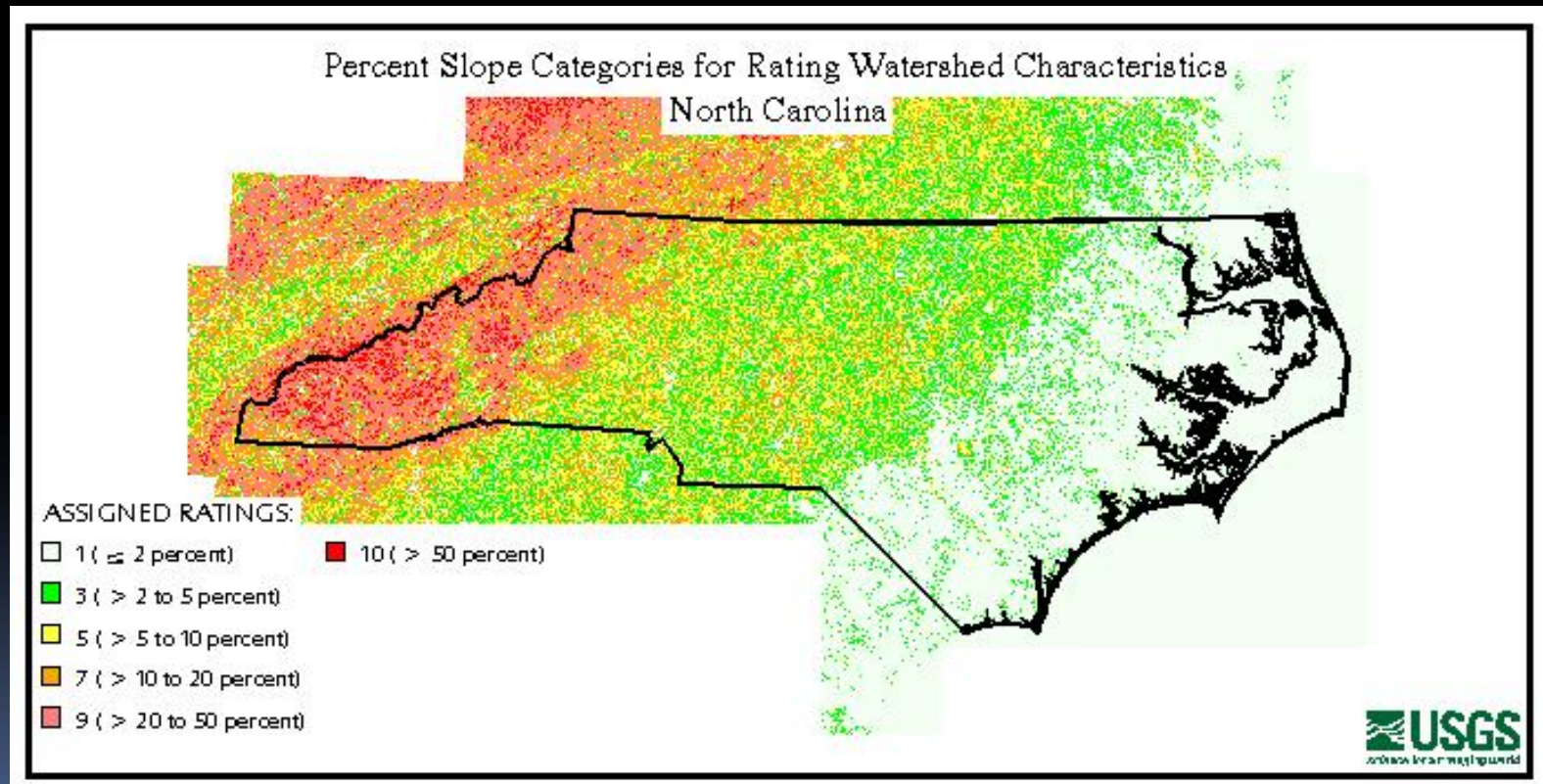
Legacies of Floyd

- North Carolina Flood Mapping Project
- demonstration project under the NWS
Advanced Hydrologic Prediction Service (AHPS)
- Landmarks and Histories
- Is there a *physical or hydrologic legacy*?



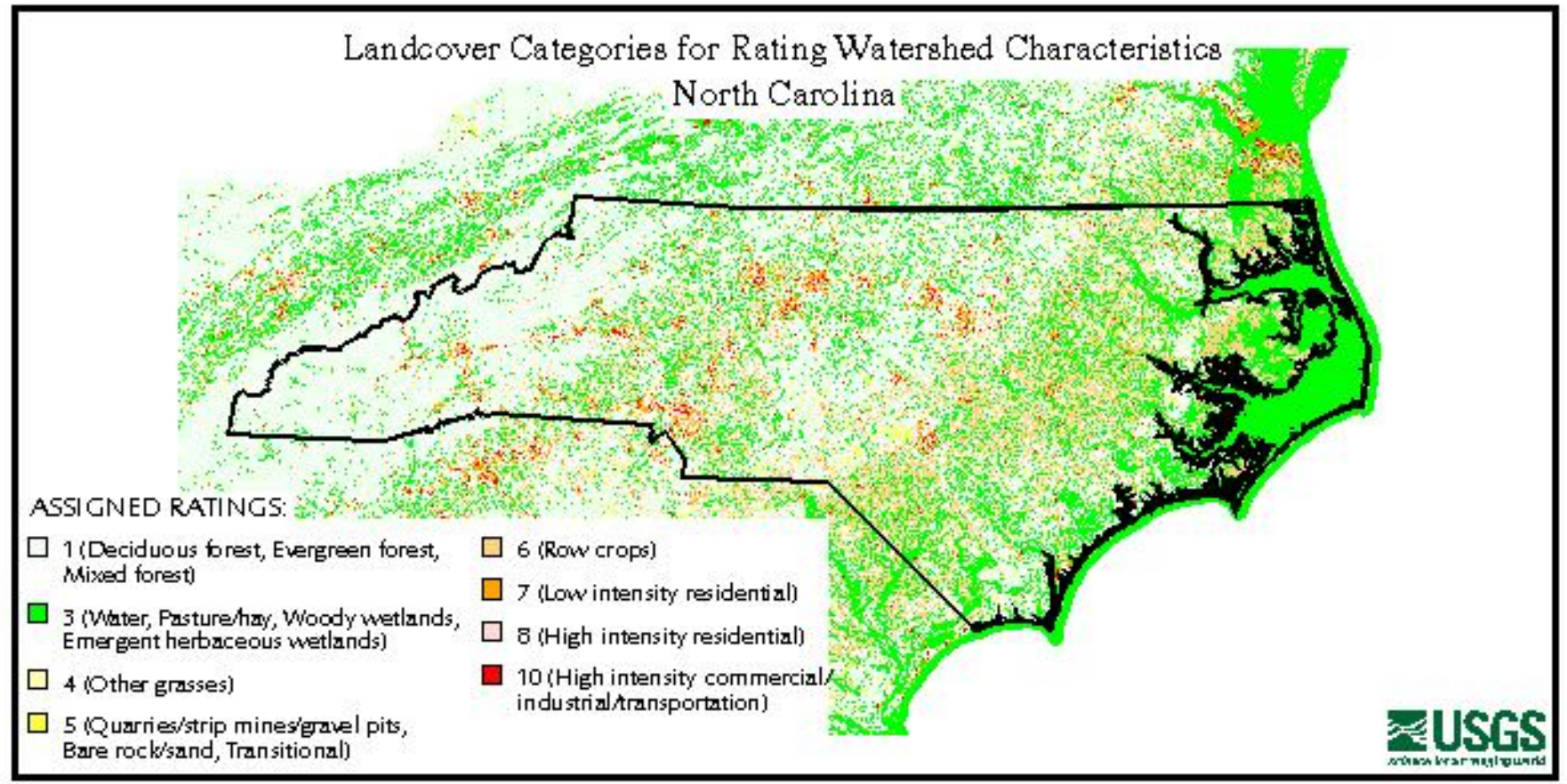
Eastern North Carolina

- Nearly level physiographic area
- Slow surface water (Carbone and Hildore 2008)



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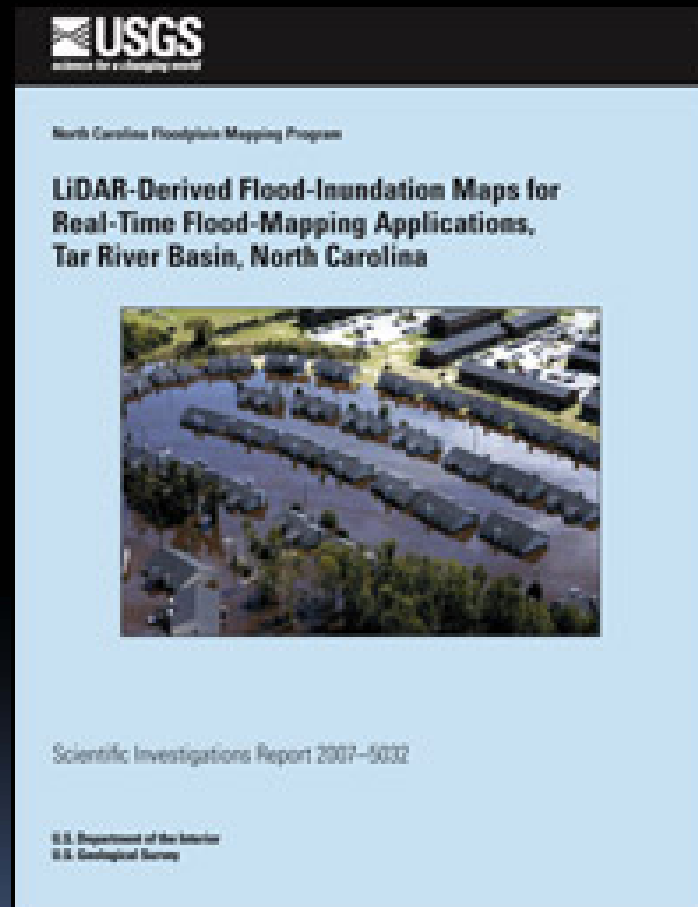
Channel Characteristics

- Urban Stream System
 - Impervious surfaces cause channelization/incision
 - Ditching and Drainage
 - Floodplains themselves

 - Did the Hurricane Floyd Flooding change channel characteristics?
 - If so, we should re-evaluate established relationships
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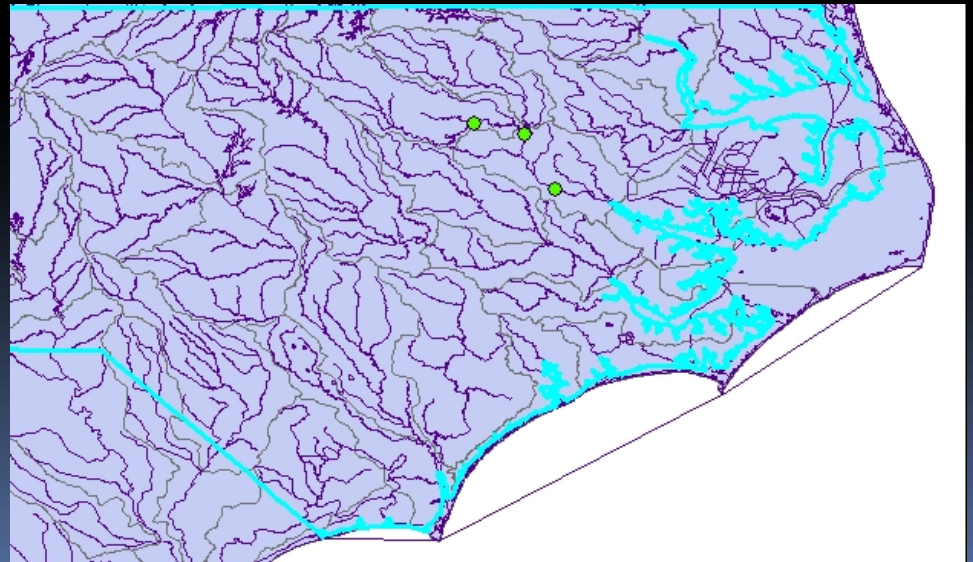
Stage – Discharge Relations

- Based on long term monitoring
- Power law curve
 - Breakpoint where $\text{disc} \uparrow \neq \text{stage} \uparrow$
- Established relationships used for flood forecasts and modeling



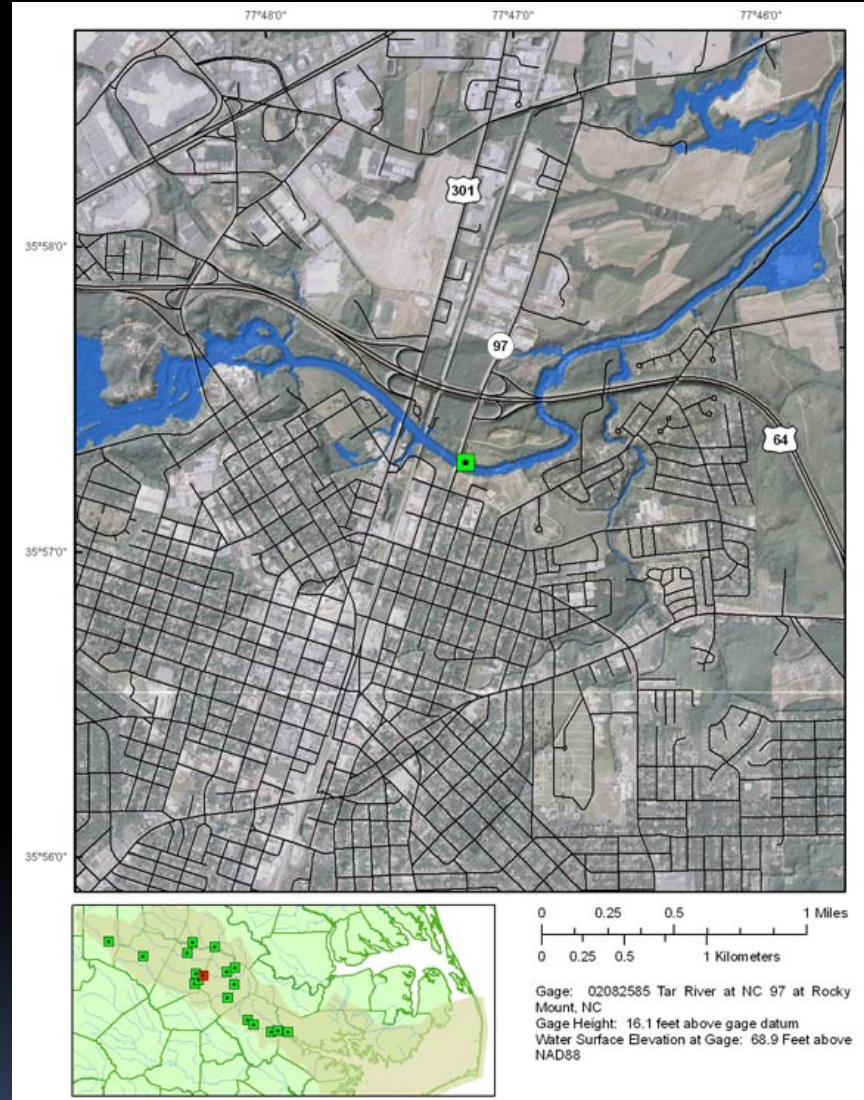
Methods: Examining Relationships

- Three Gage Sites based on NWS flood modeling program
 - ▣ Tar River @ Greenville (USGS 02084000)
 - ▣ Tar River @ NC97, Rocky Mount (USGS 02082585)
 - ▣ Tar River @ Tarboro (USGS 02083500)

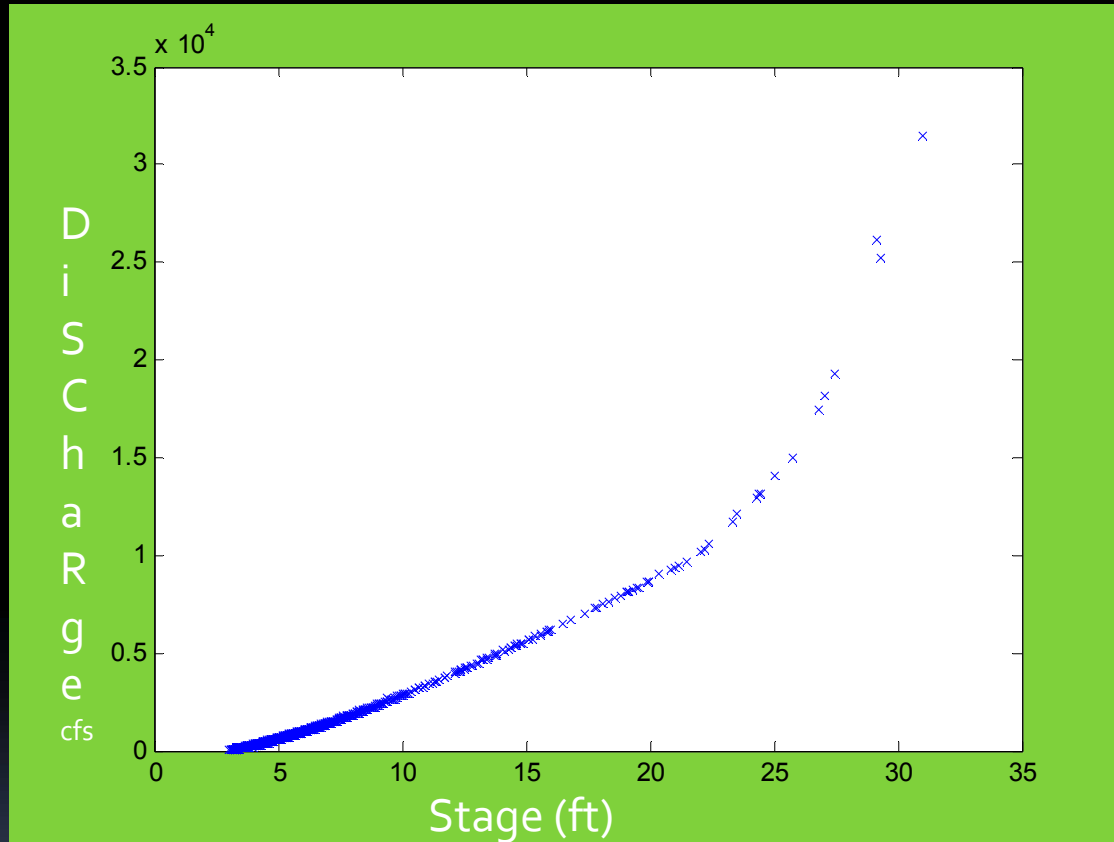


Rocky Mount

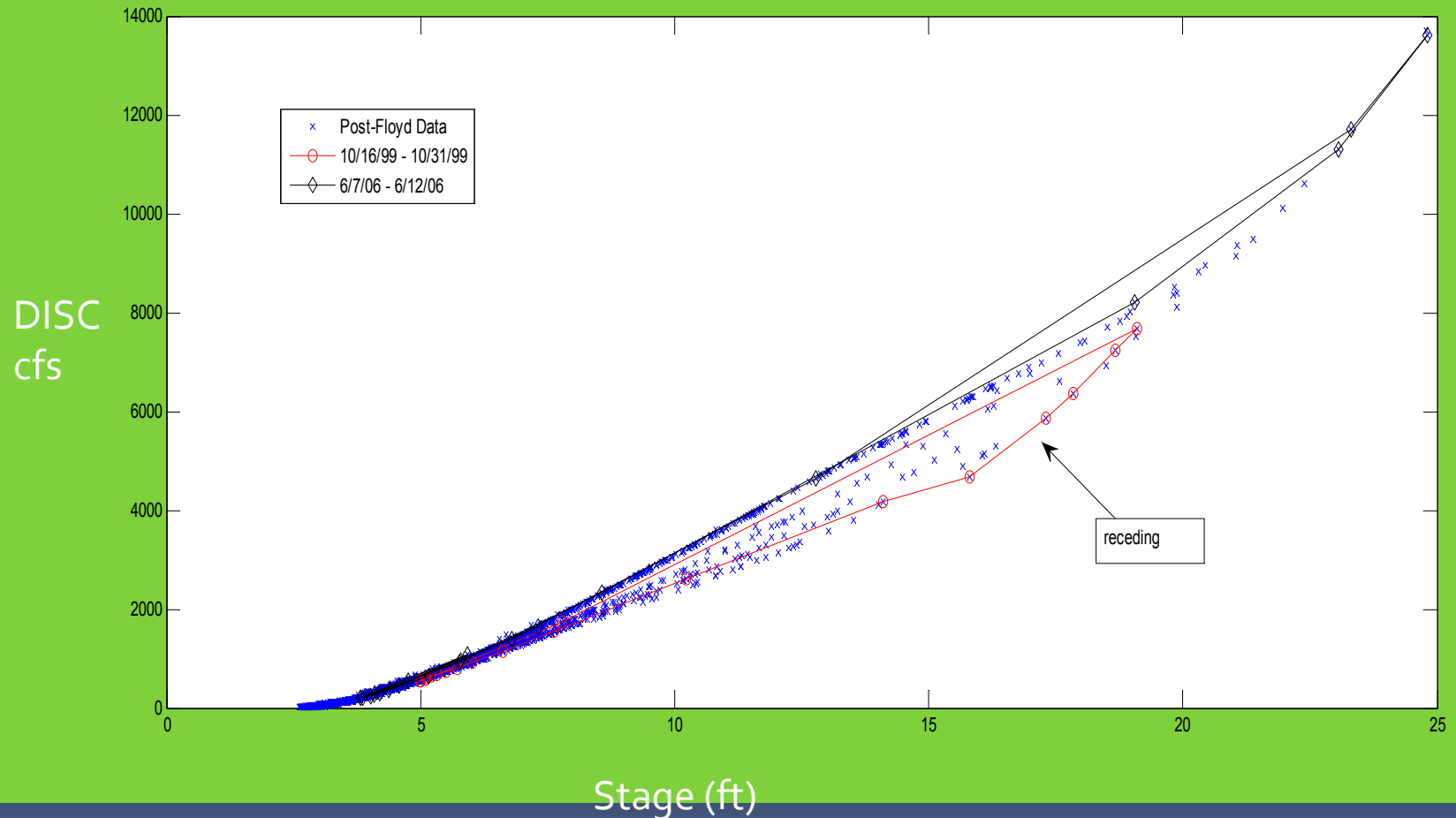
- Upstream of Tar Reservoir (since 60s)
- Inundation model based on gauge height



Previous SDC (1993 -pre 9/99)



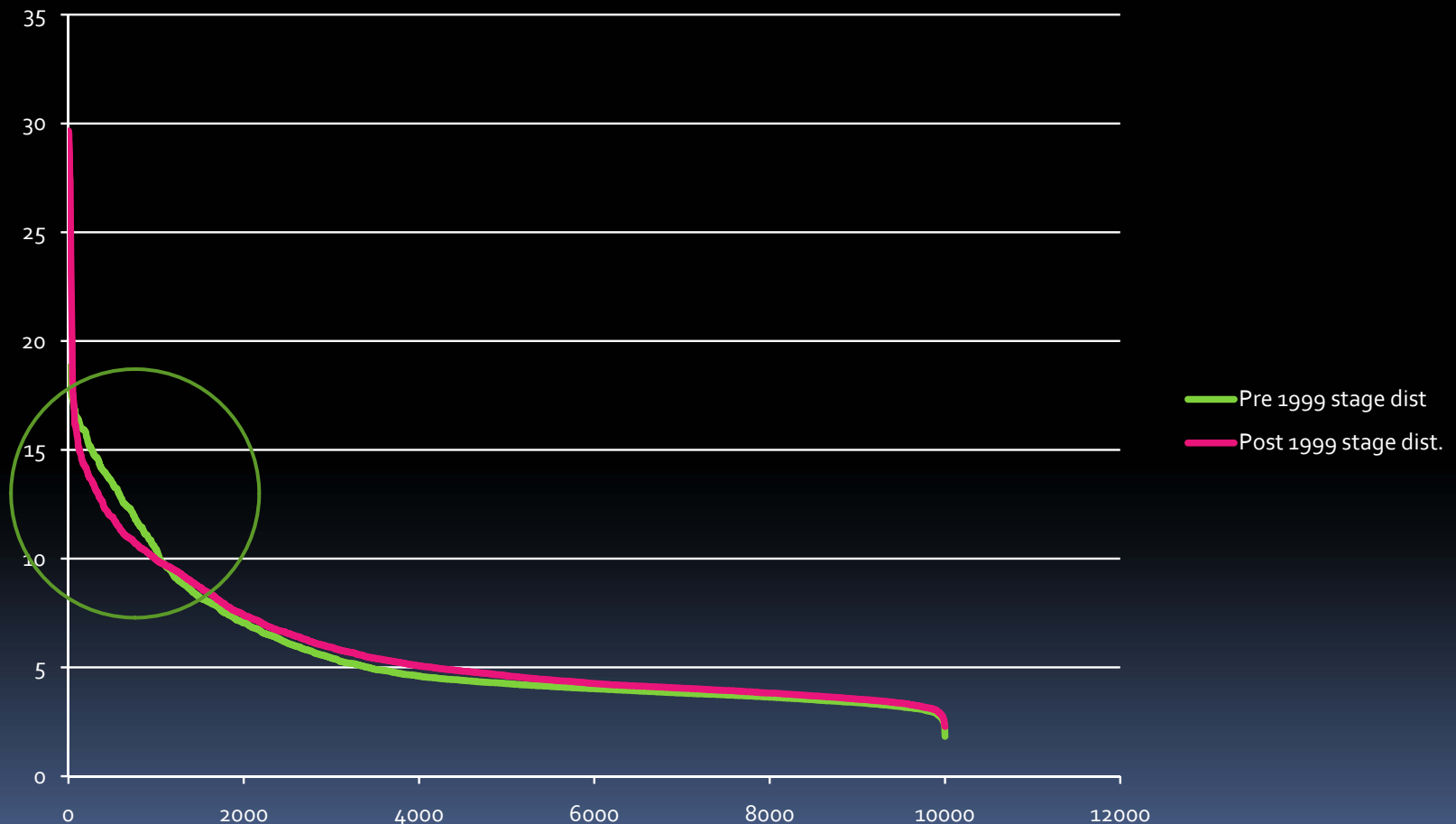
Variations in Stage-Discharge



Stage Discharge Relations



Partial Distribution Series: Greenville Gauge



Suggestive Results in SDC

- Rocky Mount SDC shows:
 - Variability
 - Possible hysteresis
 - Moderate rises vs. Extreme rises
- Tarboro/Greenville Gauges not as different
- Greenville PDS shows decrease in occurrence of moderate stage levels